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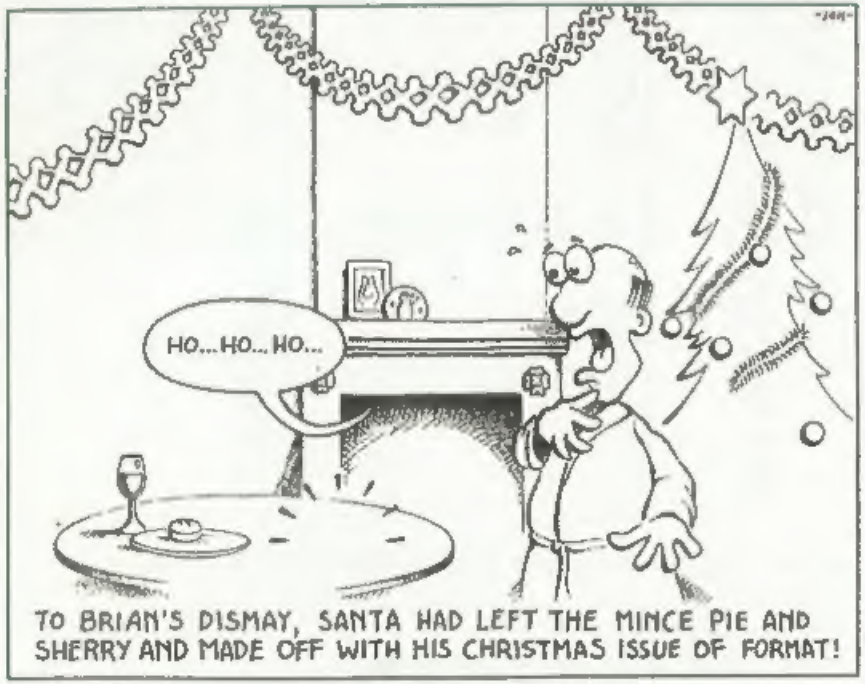

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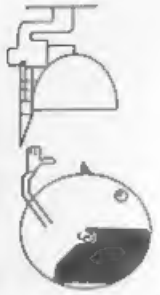

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NEWS ON 4

SEVEN YEARS ON

Christmas 1996 marks the seventh birthday of the SAM Coupé and has seen the last SAM produced in South Wales (production now having moved to the wilds of Gloucestershire - see last months *News On 4*).

Much has changed over the seven years of SAM's life, MGT and SAMCO both passed into receivership but SAM still goes on, as determined as ever, making lots of new friends along the way. Although the years have not seen the heady sales that were first predicted, SAM has established itself with a loyal (and still growing) band of enthusiasts.

Please raise your glasses and drink a toast "To SAM, happy birthday, live long and prosper."

CHANNEL 5 PROBLEMS

The new terrestrial TV station, Channel 5, has already delayed its launch for what it terms "technical reasons" but it now looks like new problems are almost certain to cause even more delays.

Recruitment and training of its force of 'Home Visit Technicians' who will have the job of retuning thousands of TV sets and video recorders is reported as being "way behind schedule". There is also growing concern that they will not be able to retune many older VCRs because technical data is not available to the field staff, and there are also reports that only one TV and VCR will be retuned per household. Currently it is expected that Channel 5 will be transmitting in some areas before March '97, but it is doubtful that other areas, those that require the maximum investment in retuning, will see the output of Channel 5 before the end of the year.

For those that need it we will be publishing details of how to retune both the Spectrum and SAM early in 1997.

UK RETAILERS SET FOR FIGHT

The Dixons Group is set to clash head-on with the Government over a European initiative that it claims will cost millions of pounds.

Dixons' company secretary, Geoffrey Budd, told a 150 strong audience of delegates at the Personal Computer Association AGM that a proposal adopted by the EC to extend consumer rights would cost the company over £300 million a year.

The EC proposal will mean that consumers can force retailers to fix products, refund money or exchange goods up to two years after purchase.

He said that while the Government is sympathetic to Dixons views, because it supports deregulation and believes that market forces should be allowed to rule on matters of this nature, he felt that it will be very hard to fight the proposal.

The draft directive is almost a straight crib from the UK's 'Sale Of Goods Act' but the major departure is the reversal of the burden of proof. Member countries will not be able to opt out, although individual states will be able to apply more stringent rules.

Budd said "This is an unnecessary and unwarranted intrusion by unelected beaurocrats that will only lead to higher consumer prices.

As yet no starting date has been fixed, but it is thought that January 1st 1999 will be set if the directive goes ahead.

HP OFFER MORE SUPPORT

One of the fastest growing markets at the moment in the computer field is Ink-Jet printing. Hewlett-Packard have long been leaders in this field and have now unveiled plans for a new support package designed to keep them ahead.

The scheme, called the HP Support Package Umbrella is aimed at helping small retailers to support their customers. Retailers joining the scheme can pass customer technical support on to HP's own support staff or special contractors that HP are employing.

While the program is really aimed at people with PCs the support available to HP's printer customers will lead to a lot more retailers pushing HP's products in favour of the opposition's.

AMSTRAD RETURN

Less than two years after pulling out of retail in favour of direct selling of its computers, Amstrad is moving back in.

Majority-owned subsidiary Betacom is to supply Dixons with Amstrad PCWs while Viglen, Amstrad's wholey-owned 'direct sales' PC vendor, is to join with Software Warehouse in order to boost its sales to the consumer market. Software Warehouse will sell Viglen models in each of its eight outlets as well as selling the machine mail-order via its 'The Family Computing Catalogue'.

These sales are on a commission basis from Viglan, which was taken over by Amstrad last year, with mail-order customers being routed to Viglan's sales team via a special orders hot-line.

Amstrad Direct, who will continue to sell the full range of Amstrad computers through mail-order, is rumoured to feel that this limited move back into the high-street will boost its image.

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At the Fair you will find everything computing at far less than shop prices. In addition to the latest hardware and software there is often quickly secondhand kit. If you have a requirement for anything to do with computers make sure you visit a Fair before spending any money. The savings can be quite impressive.

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Jan 97	4	North East	Northumbria Centre, Washington, Dest 12
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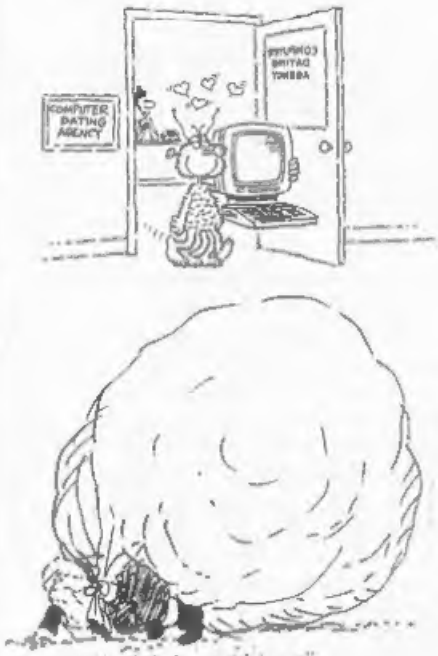

"I'll be glad when tonight's over"

The Editor Speaks

Well, here we are again, the big day approaching fast and yet another Christmas issue of FORMAT to get off to the printers. Nearly didn't happen this year. Came into the office on the 10th December, bright eyed and bushy tailed and keen to get down to the last stages of editing - to find disaster... The C: drive on the PC refused to boot, and when, after over an hour of trying, it finally kicked into life, it had caught a cold (Ok, lets be posh and call it a virus then) and trashed many of the files on the drive.

Well, to cut a long story short, 24 hrs later I'm re-writing this editorial having spent until 12:30am installing a new drive (1.7Gb wow!) and restoring most of the system from back-up tapes and then carefully copying what files I could recover from the old drive. What did I lose? Apart from my sanity (no comments you lot) and a lot of time which could have been better spent, surprisingly only the original Editorial, the News pages and some files that had been done ready for later issues. Very lucky I think, could have been far worse.

Anyway, we have packed in as much as we can for this month's issue, sorry there are so few seasonal items but there has been very little sent in this year - so let me make an urgent appeal for Christmassy items for next December's issue. There, got that in early - so you can't say I didn't give you enough notice can you?

Now, calling all programmers. A new project for the SAM is being planned to start early in 1997 and we want to share out the tasks between some good machine code programmers. If you fit the bill, and would like to play a part in the project, then please give me a ring as soon as you can, or drop me a letter or email and I will contact you. Sorry, but at this stage I can't tell you what the project is - just suffice it to say that it is big (although your part in it need not be too big if you don't want it to be) and it is exciting.

On the Spectrum side, I'm still looking for a hardware person to prototype the Spectrum version of the Clock Calendar board. There must be someone among our readers who understand Spectrum addressing and the like, the project is not too complicated - honest - all it needs is the design altering for the Speccy.

Right, will be back next month with the start of a whole new year. So it only remains for Jenny and I to wish you all a Very Merry Christmas and of course a Happy New Year.

See you all in '97.

Bob Brenchley, Editor.
Jenny Bundock, (The Real Boss).

MERRY CHRISTMAS FROM ALL AT FORMAT

SHORT • SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

I'm typing in Coventry. No, I've not been sent there; I've gone of my own free will. And I'm hoping that the discs and snippets you've all been kind enough to send me will work for me on one of the Spectrums when I get back. I have solved my 'format' problem (the discs; not Bob!). Simple. I complained about everything but the right fault, as it were! The PLUS D that I bought is dodgy! If anyone has a decent PLUS D, please don't send it to Coventry! (No; it's not that they only want indecent ones here, Lady Godiva or no; it's that we'll all be safely back as soon as Lorri's dad's had his operation). So do drop me a line at Bishampton if you suddenly intend setting up a chip factory for obsolete PLUS D chips!

Anyway, enough of this. Let's start this Special Crimbles Issue with a touch of magic from Roy Burford, of Norton, Stourbridge. Yes, a lot of us recognize his name, and I am so grateful to him for his many contributions to Short Spot. Firstly, I have one or two bits that have been left over from last month so that Bob could make **Short Spot** fit ***FORMAT***! When Roy wrote to me last month about Simon Turk's problem, he also enclosed a disc with three Spectrum programs. Those of you who also have a PC, and who have seen issue 1 of FORMAT PC will also have seen an article by Alan Cox, whose words often used to turn up here when he had a working Spectrum. For those who haven't seen FORMAT PC, Alan refers to 'Personal Computer World' of August 1985, where Mike Mudge first published the mathematical problem. This was simply to determine the smallest power of 2 that contains a given number of consecutive zeros in its decimal expression. The smallest power of two that contains one zero is 1024; two zeros is 9007199254740992 (=2^53). The block of consecutive zeros does not, of course, always start with the second digit! A Clive Tooth of London has got as far as *eleven* consecutive zeros! Alan's programs were originally written in SAM Basic and later converted into GW-Basic, and on seeing these, Roy decided to have a go on the Spectrum!

STR0in2^nt finds the smallest powers of two having numbers of consecutive zeros, starting with one. The time taken is also calculated. The Spectrum takes a long time over consecutive zeros greater than 2, as does a Commodore 64, but scores over the latter in that it is not limited to a string length of 255 characters. Roy writes that he has not yet had the patience to wait for the Spectrum to go beyond four consecutive zeros!

Here it is: type in STR0in2^nt, save it, load it into your *spare* Spectrum. Leave it puttering away in the corner of the spare bedroom, and pray that there won't be any power cuts!

```
1 REM Vol1 No1. FORMAT PC. Oc
  tober 1996. p11. Counting t
  he Zeros. Alan Cox.
2 REM Revised on ZX Spectrum+
   128K by B.C.R.Burford 0710
  96.
4 GOTO 8
```

```
  5 LET p$="STR0in2^nt": SAVE d
    1""+p$: VERIFY d1""+p$: SAV
    E d2""+p$: VERIFY d2""+p$:
    STOP
  8 PRINT "Least 2^n with conse
    cutive 0's"''
 10 LET u=1: LET z=0: LET m=256
 20 FOR p=u TO 10: LET s$=""
 21 IF p>2 THEN PRINT "Please w
    ait........"
 22 GOSUB 400: LET b=y
 25 FOR s=u TO p: LET s$=s$+"0"
    : NEXT s
 30 LET po=z: LET a$="1"
 50 LET n$=a$
 60 LET a$=""
 70 LET ca=z
 80 LET po=po+u
 90 FOR t=LEN (n$) TO u STEP -u
100 LET q=2*VAL n$(t)+ca
110 IF q>9 THEN LET q=q-10: LET
     ca=u: GOTO 130
120 LET ca=z
130 LET a$=STR$ q+a$
140 NEXT t
150 IF ca THEN LET a$="1"+a$
160 LET l=LEN a$
170 FOR w=u TO l-p+u
180 IF a$(w TO w+p-u)=s$( TO p)
     THEN GOSUB 400: LET f=y: G
    OSUB 300: GOTO 210
190 NEXT w: GOTO 50
210 NEXT p
220 STOP
300 POKE 23692,255: PRINT "Cons
    ecutive zeros= ";p: PRINT "
    Power= ";po: PRINT "Length
    number= ";l: REM POKE defea
    ts scroll?
310 PRINT "Number="; PRINT a$:
    PRINT "Time= ";(f-b)/50;"s"
    : PRINT : RETURN
400 LET y=PEEK 23672+m*PEEK 236
    73+m*m*PEEK 23674: LET y1=P
    EEK 23672+m*PEEK 23673+m*m*
    PEEK 23674: IF y1>y THEN LE
    T y=y1: RETURN
410 RETURN
```

Well, all this is fine, but not fine enough! The powers of two in this program are found by the integer/string method to avoid running into E notation which occurs with exponentiation. To get round this problem, Roy has arrived at two further programs. The first is 'pow2stsesp', which calculates string series of powers of 2. The output may be directed to the screen, or, in Roy's case, a serial 8056 printer and illustrates Roy's comments about Line 270 mentioned earlier.

```
  1 REM Vol1 No1. FORMAT PC. Oc
    tober 1996. p11. Counting t
    he Zeros. Alan Cox.
  2 REM Revised on ZX Spectrum+
     128K by B.C.R.Burford 0710
    96.
  4 GOTO 10
  5 LET p$="POW2stsesp": SAVE d
    1""+p$: VERIFY d1""+p$: STO
    P : SAVE d2""+p$: VERIFY d2
    ""+p$: STOP
 10 POKE 23658,0: LET u=1: LET
    z=0
 15 PRINT #2;"  Powers of Two S
    tring Series"''
 20 INPUT "Highest exponent(>1)
    :";ex
 21 LET ex=INT ex: IF ex<2 THEN
     GOTO 20
 22 INPUT "Screen(s) or Printer
    (p):";o$
 23 IF o$<>"s" AND o$<>"p" THEN
     GOTO 22
 24 IF o$="s" THEN LET ou=2: GO
    TO 30
 25 LET ou=3: FORMAT "p";1200
 27 IF ou=3 THEN PRINT #ou;"Pow
    ers of Two Strings"''
 30 LET po=z: LET a$=STR$ u
 50 LET n$=a$: LET a$="": LET c
    a=z: LET po=po+u
 80 IF po>ex THEN GOTO 200
 90 FOR t=LEN (n$) TO u STEP -u
100 LET q=2*VAL n$(t)+ca
110 IF q>9 THEN LET q=q-10: LET
     ca=u: GOTO 130
120 LET ca=z
130 LET a$=STR$ q+a$
140 NEXT t
150 IF ca THEN LET a$="1"+a$
160 POKE 23692,255: REM Defeat
    scroll?
170 PRINT #ou;"Power= ";po;"
          Digits= ";LEN a$
180 PRINT #ou;"Number= ";a$
190 GOTO 50
200 PRINT #ou
210 STOP
```

And finally, 'powstrsp' arrives at individual powers of two strings and sends them either to the screen or the printer.

```
  1 REM Vol1 No1. FORMAT PC. Oc
    tober 1996. p11. Counting t
    he Zeros. Alan Cox.
  2 REM Revised on ZX Spectrum+
     128K by B.C.R.Burford 0710
    96.
  4 GOTO 10
  5 LET p$="POW2strsp": SAVE d1
    ""+p$: VERIFY d1""+p$: STOP
     : SAVE d2""+p$: VERIFY d2"
    "+p$: STOP
 10 POKE 23658,0: LET u=1: LET
    z=0
 15 PRINT #2;"    Power of Two
    String"''
 20 INPUT "Exponent required(>1
    ):";ex
 21 LET ex=INT ex: IF ex<2 THEN
     GOTO 20
 22 INPUT "Screen(s) or Printer
    (p):";o$
 23 IF o$<>"s" AND o$<>"p" THEN
     GOTO 22
 24 IF ex>30 THEN PRINT #2: PRI
    NT #2;"Please wait.........
    ."
 25 IF o$="s" THEN LET ou=2: GO
    TO 30
 26 LET ou=3: FORMAT "p";1200
 27 IF ou=3 THEN PRINT #ou;"
     Power of Two String"''
 30 LET po=z: LET a$=STR$ u
 50 LET n$=a$: LET a$="": LET c
    a=z: LET po=po+u
 90 FOR t=LEN (n$) TO u STEP -u
100 LET q=2*VAL n$(t)+ca
110 IF q>9 THEN LET q=q-10: LET
     ca=u: GOTO 130
120 LET ca=z
130 LET a$=STR$ q+a$
140 NEXT t
150 IF ca THEN LET a$="1"+a$
160 IF po<>ex THEN GOTO 50
170 PRINT #ou;"Power= ";po;"
      Digits= ";LEN a$
180 PRINT #ou;"Number= ";a$''
210 STOP
```

You know, Roy is a most prolific producer of bits and pieces. I wondered until this month how he did it: a letter containing specially seasonal bits and pieces has revealed all. His C-64 son-in-law passed him three nicely shortish programs (*now* we know where he gets 'em all from), which Roy, being incredibly skilled at the game, has adapted for the Spectrum. Enough said; a good Christmas type! Here they are; the first is called 'Fircones'...

```
  1 REM Computer Choice. Januar
    y 1984. p92. Software City.
     Spirographic-like patterns
    .
  2 REM Revised on ZX Spectrum+
     128K by B.C.R.Burford 1411
    96.
 10 FOR x=1 TO 254 STEP 2
 25 LET y=100+50*SIN (x/254*PI*
    2)
 30 LET z=25*SIN (x/254*PI*3)
 40 CIRCLE x,y,z
 50 NEXT x
 60 STOP
```

Yes, quite right. Draws pretty fircones for the Christmas Tree at the drop of a Spectrum. Now the second - how about a nice Christmas bracelet?

```
  1 REM Computer Choice. Januar
    y 1984. p92. Software City.
    Spirographic-like patterns.
  2 REM Revised on ZX Spectrum+
     128K by B.C.R.Burford 1411
    96. Software City suggest c
    hanging multiples of PI in
    LL 22 & 25.
 10 CLS
 20 FOR i=1 TO 254 STEP 2
 22 LET x=120+80*COS (i/254*PI*
    2)
 25 LET y=100+50*SIN (i/254*PI*
    2)
 30 LET z=25*SIN (x/254*PI*5)
 40 CIRCLE x,y,z
 50 NEXT i
 60 STOP
```

All right so far? Now for the fun one. Roy calls this the OUT 254 trick. See if you can see how it works - he's annotated it pretty well.

```
 1 REM Computer Choice. Januar
   y 1984. p92. Software City.
    W.R.Billany(Hull). OUT 254
    trick.
 2 REM Revised on ZX Spectrum+
    128K by B.C.R.Burford 1411
   96. Messages changed.
20 PRINT AT 10,3; FLASH 1;"FOR
   MAT & FORMAT PC"; FLASH 0:
   PRINT AT 15,10;"Press a key
   ;"
100 REM a=border colour - 3 in
   original. RND *8 produces r
   andom noise presumably beca
   use a goes negative.
150 LET a=RND*8
200 FOR i=1 TO 10
300 OUT 254,a-2
400 OUT 254,a
500 NEXT i
600 IF INKEY$="" THEN GOTO 150
700 CLS : PAUSE 25: REM Rest of
    program/example follows:
720 PRINT AT 12,11; INVERSE 1;"
   Read them"; INVERSE 0
725 PRINT AT 15,8; INVERSE 1;"M
   erry Christmas"; INVERSE 0
750 PAUSE 25
800 GOTO 700
```

Many thanks for all those bits and pieces, Roy, and more power to your elbow!

Next, we have a query from Mr Hunter of Ogmore-by-Sea, Mid Glamorgan. He asks if the 'Colour Weaver' program will easily run on a SAM. As 'Colour Weaver' is a Spectrum program, and as Spectrum Basic is a subset of SAM Basic, it should work as it stands, although there might be bits and pieces you could put in to make it neater. Provided you type it in, of course. After that, things get much more complicated. You see, an analogy might be that Spectrum speaks Welsh, whereas SAM only speaks English (or should that be the other way round?) So while they both know what the numbers will mean to them after they've been translated, they can't converse. And it's the bits and bobs in the tape, their own native language, which they can't understand. You don't believe me? Try giving your wife instructions in Welsh to put the tape in, when all she understands is English! So though the words of the program are just the same, the processing before you get there is different, and you have to have some sort of translating device. Hope this and the next few bits and pieces help, and good luck with your translation.

Let's continue with the problem of converting things from Spectrum to SAM. Martijn Groen of Vlaardingen, The Netherlands, writes to me in perfect English about John Turner's letter in the last issue of ***FORMAT***; oh that I could reply in perfect Dutch, but I can't (shame, Wase). Martijn says in reply to John's letter, that he might be able to help, as he's been converting a lot of 48 and 128k programs to SAM recently.

Here, then, is some information about the 128k paging system. Memory pages can be paged in by means of the POKE 23388,n command in Basic, or OUT 32765 in machine code. In Basic, make sure RAMtop is below 49152!

Page 5: 16384-32767 standard 16k
Page 2: 32768-49151 standard 16k
Page 0: 49152-65535 standard 16k
Pages 1, 3, 4, 6, 7:
49152-65535 standard 80k

n = byte to be poked or sent to address port.

bit 0-2: 16k page 0-7
bit 3: 0 = screen at 16384
1 = screen at 49152
bit 4: 0 = 128 k Editor ROM
1 = 48 k Basic ROM
bit 5: 0 = paging in use
1 = 48 k mode

Many thanks, Martijn.

One of the problems about Basic programs is that they take up quite a lot of memory. I've got a few Spectrum jottings from Miles Kinloch of Edinburgh

on this subject which might be particularly useful when one is translating from one Basic to another. Miles heads them "adding VALs and taking away bytes"; a rather neat way of putting things. Miles writes that most people will have come actoss VAL constructions and expressions like NOT PI, SGN PI and so on in Basic programs, and many of you will know why these forms are used. Bluntly, to save memory.

There are, however, some finer points worth bearing in mind in order to make the most of these techniques and use them to their fullest advantage. One of the drawbacks about the VAL function is that it's fairly slow, and should therefore be avoided if possible in sections of a program where speed is important. Examples might be a loop with a large number of iterations, where the cumulative effect could be considerable, or a keypress routine where a delayed response would be undesirable.

An alternative to VAL is the CODE 'character' function. This takes even fewer bytes, and has the bonus of being almost as fast as the number form, and so can be used much more liberally in time-critical loops. Being restricted to integers in the range 0-255, however, makes it unable to act as a universal substitute for VAL.

Let's then look in greater depth at the role of VAL in compound expressions, as this is an area that frequently offers scope for greater economy, but is often overlooked.

Take, for example, the statement:-

```
LET a=PEEK 30000+256*PEEK 30001
```

One way to 'VAL' it would be as follows:-

```
LET a= PEEK VAL "30000"+ VAL "25
       6"* PEEK VAL "30001"
```

However, a more economical way would be:-

```
LET a= VAL " PEEK 30000 + 256* P
       EEK 30001"
```

The first method uses three VALs; the second only one, and is therefore six bytes shorter. In other words, if, instead of VALing each number separately, we enclose the *whole expression* in a *single VAL*, this is less wasteful. 128k users - beware! The 128K Editor changes any tokens within quotes to the individual letters that comprise them, so always use 48k mode to enter or edit such statements.

Now lets look at some more subtle ways where bytes can be saved by careful formalation of the expression...

Again, we'll start with an example:-

```
LET a=INT (RND*20)
```

Many people would change this to :-

```
LET a= INT ( RND * VAL "20")
```

However, a more efficient rendering would be:-

```
LET a= INT VAL "RND*20"
```

In the latter, the brackets are dispensed with, saving a further two bytes. Instances like this occur quite commonly in programs, where the 'enclosing' action of VAL can be put to profitable effect in making brackets redundant. A similar situation arises with the CHR$ function. Here, brackets are needed when the argument consists of more than a single unary expression.

Take, for instance:-

```
LET a$= CHR$ (a+32)
```

VALing the number on its own still requires parentheses:-

```
LET a$= CHR$ (a+VAL "32")
```

But by VALing the whole CHR$ argument, we can do away with them and save two bytes:-

```
LET a$= CHR$ VAL "a+32"
```

Don't forget, functions like INKEY$ etc.,

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also count as part of an expression and can be usefully VALed (taking into account keyboard response time, of course).

Say we have a statement such as:-

```
GOTO a*( CODE INKEY$ -48)
```

there's nothing to prevent its being arranged as follows, disposing of the brackets in the process:-

```
GOTO a* VAL " CODE INKEY$ -48"
```

Next, let's consider the generally held assumption the number 1 should always be substituted with SGN PI. In most cases, this is indeed so, but there are exceptions to the rule. For example, take the statement:-

```
LET a=10*b+1
```

One way of tackling this would be to change it to:-

```
LET a= VAL "10"*b+ SGN PI
```

Or:-

```
LET a= VAL "10*b"+ SGN PI
```

Neither of these has any inherent advantage over the other, but there is a third choice which is distinctly preferable:-

```
LET a= VAL "10*b+1"
```

The principle here is that by including '1' inside an *existing* VAL, we use one byte less than a separate SGN PI would take. Similar reasoning applies to NOT PI, INT PI and so on.

In a real program, of course, there are often conflicting considerations to take into account, which the cut-and-dried examples above don't fully bring out. It's often more a matter of balancing one factor against another, rather than adhering rigidly to any fixed rule.

Let's take, for instance:-

```
LET C= INT ( RND *6) +1
```

Here, there are two aspects to think about: should we enclose the whole expression in a VAL, including the 1; or would it be better to go for:-

```
INT VAL " RND *6"+ SGN PI
```

and get rid of the brackets? While SGN PI may take two bytes as opposed to the 1's one (well; this is the way Miles puts it!), this is outweighed by the two-byte saving achieved through eliminating the brackets, thus making the latter more efficient.

If, on the other hand, the statement had been:-

```
LET C= INT ( RND *6)+8
```

Here, the situation would have been different: 8, unlike 1, can't be expressed in two bytes: VAL "8" is the shortest form, i.e. a *four*-byte expression. This now tips the scales in favour of keeping the brackets (a two-byte deficit), and doing away with the second VAL (a three-byte gain):-

```
LET C= VAL "INT ( RND *6)+8"
```

...is shorter, in terms of bytes, than:-

```
LET C=INT VAL " RND *6"+ VAL "8"
```

Another point to remember is that with INT PI, the 'INT' can often be dropped, as many BASIC commands will round it anyway. Constructions such as PAPER PI, PRINT AT PI,PI, etc., are all quite acceptable. You can also use other combinations with PI to save memory over the VAL form. PI+PI, for instance, is only three bytes; VAL "6" is four. Again, the fact that these forms don't produce round integers is irrelevant for many purposes.

A 'false friend' in this respect is BIN. On the face of it, it looks like the ideal single-byte expression for zero - but it isn't. BIN expressions, like regular numbers, are always accompanied by the five hidden bytes. BIN on its own still implies an argument of zero, and is therefore represented in floating-point format.

Finally, writes Miles, here's a little teaser. Take the statement:-

```
LET A=1+1
```

Which statement is shorter, in terms of bytes:-

```
LET A= SGN PI + SGN PI
```

or:-

```
LET A= VAL "1+1"
```

"I'll leave everyone," writes Miles, "to ponder that, I think..."

So you can see that with an individual statement, the savings may seem small, but in a large program where complex expressions occur, observing these points can achieve a significant reduction in size.

Finally, a little game for Christmas. A version of 'Solitaire' again by Miles Kinloch. Do you know 'Solitaire'? Its the game with a circular wooden board with three rows of depressions up and down, crossed by three rows of depressions running right to left. You do? Good! You don't? Oh dear; ask your Dad! Miles writes that once you know how to do a puzzle, it, of course, tends to lose its appeal, so he won't spoil everyone's fun by revealing the solution... Many thanks for all the bits and pieces, Miles.

```
10 REM    SPECTRUM SOLITAIRE
20 REM     By Miles Kinloch
30
40 BORDER 1: PAPER 1: PEN 6: C
   LS : GOSUB 350
50 PRINT BRIGHT 1; PAPER 0; PE
   N 7; AT 0,4;" SOLITAIRE INS
   TRUCTIONS ": PRINT '''" Th
   is game can be played using
    Sinclair Joystick or arrow
    keys.'''" Select a peg by
    placing the  cursor over
   it and pressing FIREor ENTE
   R, then move it over an  ad
   jacent peg to a hole on the
      other side, vertically o
   r horiz-ontally but not dia
   gonally, and press ENTER or
    FIRE again. The  peg jumpe
   d over will then dis-  appe
   ar, and the object of the
    game is to continue in thi
   s way until you are left wi
   th one sol-itary peg in the
    centre hole."
60 PRINT #0; PAPER 2; PEN 7; A
   T 1,4;"PRESS ANY KEY WHEN R
   EADY": GOSUB 330: PAUSE 1:
   PAUSE 0: CLS
70 LET a$=CHR$ 144+" "+CHR$ 14
   4+" "+CHR$ 144: PRINT 'CHR$
    145;" = HOLE"''CHR$ 144;"
   = PEG"; AT 1,24;"DELETE =";
    AT 3,24;"NEW GAME"; BRIGHT
    1; AT 21,2;"Program (PD) 1
   990 M. Kinloch": FOR n=4 TO
    6: PRINT AT n*2,9;a$;a$(2
   TO 4);a$: NEXT n: PRINT AT
   4,13;a$; AT 6,13;a$; AT 14,
   13;a$; AT 16,13;a$; AT 10,1
   5; PEN 5;CHR$ 145: CIRCLE 1
   23,92,78: CIRCLE 123,92,77:
    CIRCLE 123,92,70
80 LET y=10: LET x=15: LET x2=
   x: LET y2=y: LET f=0: LET p
   egs=32
90 PRINT OVER 1; BRIGHT 1; FLA
   SH 1; PEN 16; AT y,x;" "
100 LET k=CODE INKEY$: IF NOT k
    THEN GOTO 100
110 PRINT OVER 1; PEN 16; AT y,
   x;" ": BEEP .01,20
120 IF (k=8 OR k=54) AND (y<8 O
   R y>12) THEN LET x=x-2*(x>1
   3): GOTO 90
130 IF (k=9 OR k=55) AND (y<8 O
   R y>12) THEN LET x=x+2*(x<1
   7): GOTO 90
140 IF (k=10 OR k=56) AND (x<13
    OR x>17) THEN LET y=y+2*(y
   <12): GOTO 90
150 IF (k=11 OR k=57) AND (x<13
    OR x>17) THEN LET y=y-2*(y
   >8): GOTO 90
160 IF k=8 OR k=54 THEN LET x=x
   -2*(x>9)
170 IF k=9 OR k=55 THEN LET x=x
   +2*(x<21)
180 IF k=10 OR k=56 THEN LET y=
   y+2*(y<16)
190 IF k=11 OR k=57 THEN LET y=
   y-2*(y>4)
200 IF k=13 OR k=48 THEN BEEP .
   1,10: BEEP .1,15: GOTO 230
210 IF k=12 THEN BEEP .1,10: BE
   EP .4,-10: BEEP .1,10: RUN
   70
220 GOTO 90
230 IF f AND ATTR(y,x)=14 OR NO
   T f AND ATTR(y,x)=13 OR f A
   ND NOT (ABS (x2-x)=4 AND y2
   =y) AND f AND NOT (ABS (y2-
   y)=4 AND x2=x) THEN GOSUB 3
   20: GOTO 90
240 IF NOT f THEN GOSUB 330: LE
   T x2=x: LET y2=y: LET f=1:
   GOTO 90
250 IF y2>y THEN LET y3=y+2: LE
   T x3=x
260 IF y2<y THEN LET y3=y-2: LE
   T x3=x
270 IF x2>x THEN LET x3=x+2: LE
   T y3=y
280 IF x2<x THEN LET x3=x-2: LE
   T y3=y
290 IF ATTR(y3,x3)=13 THEN GOSU
   B 320: GOTO 90
300 PRINT PEN 5; AT y2,x2;CHR$
   145; AT y3,x3;CHR$ 145: PRI
   NT AT y,x;CHR$ 144: LET f=0
   : LET pegs=pegs-1: IF pegs=
   1 AND ATTR(10,15)=14 THEN P
   RINT #0; BRIGHT 1; FLASH 1;
    AT 1,1;"C O N G R A T U L
   A T I O N S !": BEEP .1,15:
    BEEP .1,19: BEEP .1,22: BE
   EP .1,27: BEEP .1,31: BEEP
   .1,34: BEEP .2,39: PAUSE 1:
    PAUSE 0: RUN 70
310 GOSUB 330: GOTO 90
320 PRINT #0; FLASH 1; PAPER 2;
    AT 1,8;" ILLEGAL MOVE! ":
   BEEP .8,-15: LET f=0: GOSUB
    330: INPUT ;: RETURN
330 IF CODE INKEY$=12 OR CODE I
   NKEY$=13 OR CODE INKEY$=48
   THEN GOTO 330
340 RETURN
350 FOR n=UDG "A" TO UDG "B"+7:
    READ d: POKE n,d: NEXT n:
   RETURN : DATA 24,126,126,25
   5,255,126,126,24,24,102,66,
   129,129,66,102,24: REM UDGs
9999 SAVE d1"SOLITAIRE" LINE 10
```

So, let me end by thanking you all for your help, support and friendship, and the usual appeal; please keep all your snippets coming to me; without them I can't put a column together. Please send them to:-

John Wase,
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
WR10 2LX.

A Happy Christmas to you all. See you next month.

"Here hold on, there seems to be a 'Santa' clause in this contract"

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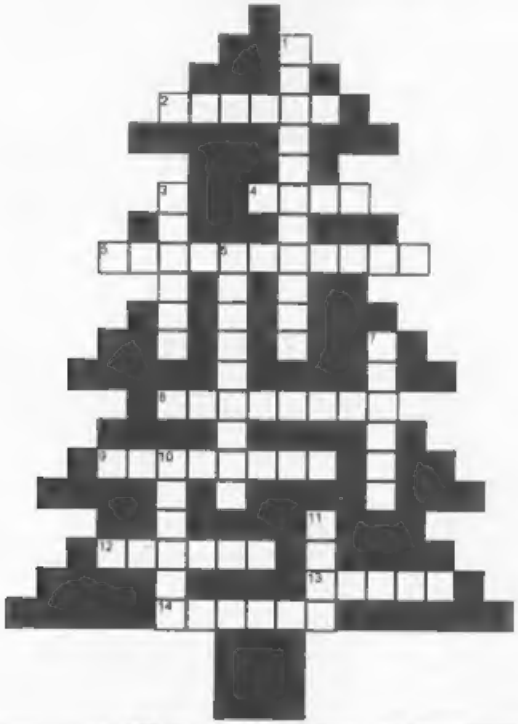
XMASXWORD

By:- Carol Brooksbank.

Here is a nice little Festive Season crossword, designed by Carol to help you while away one of those afternoon rest periods. You know, one of those short periods between lunch and tea. No prizes, it is just for fun, and we will print the answers next month, and make sure this is the only cross word you have the Christmas.

CHRISTMAS



ACROSS

2. The place to go at Midnight
4. Short magicians? No, but they were wise
5. When the children receive an orange
6. Find them under the tree or in your stocking
9. Santa never leaves home without them
12. Where the horses find equilibrium
13. Is the Christmas bird a well-known outlaw?
14. The one least likely to enjoy Christmas dinner

DOWN

1. Hang them up about the house
3. Sounds like the songs belong to Mrs. Brooksbank
8. They were not criminals but they knew all about crooks
7. The father of the Family
10. The Spanish princess endlessly names the Holy Child
11. Shall we hail her?

The HELP PAGE

Edited By:- Ray Bray.

To start this month's contribution we have a couple of Spectrum questions from Archie Perry of Stalham, Norwich. Archie has been using a green screen monitor with his 48K Spectrum and now having acquired a +2A, would like to be able to use the monitor with this machine. He has tried connecting the ground and composite sync. pins from the +2A RGB socket to the monitor but this had no effect, so could we help? You say that you altered your 48K to work with the monitor but you didn't say what connections were being used. I assume that you took the output from the expansion connector of the 48K and used the composite video signal (pin 15B), the video Y signal (pin 16B which is a combined luminance and sync signal), plus the ground pin.

Unfortunately the +2A does not provide a combined video output, unlike the 48K and the +2. However, the first thing you could try is to connect one of the colour output pins, plus the the composite sync pin and the GND to the monitor, and see what happens. If this produces a result you might have to select the same INK colour and BRIGHT to produce an acceptable display. If this does not work then, alternatively, if you are handy with a soldering iron and are not afraid of taking the computer apart, you can take the combined video signal from where it is input to the UHF modulator (this is the small silver box situated behind the TV socket). The combined video signal is fed to the modulator via the wire coming up from the circuit board furthest away from the TV socket. Take the video signal from here, plus the sync signal and GND from RGB socket, via a screened cable to the monitor.

Archie's second question concerns connecting a PLUS D to the +2A, which he tried doing but found it did not work. Once again you are up against the problem of Amstrad not making the 2A expansion connector compatible with earlier models of the Spectrum. No doubt they did this with the best intentions but it does make life difficult for those people who change from the previous models and wish to continue using their existing add-on equipment. The trouble in this instance is that there is no 9V supply on the connector and the signals to disable ROM1 and ROM2 are on the wrong pins for the PLUS D connector. As a result a small adaptor board is required to correct this incompatibility.

What the board does is to connect pin 4B directly to pin 22A to provide the power supply, and connect pins 4A and 15B to pin 25B, via diodes, to provide the switching signals for the ROM's when the +D is active. It would be possible to manufacture one of these boards if you are used to making up printed circuit boards but I would not think it is something a novice could undertake. The adaptor alone will enable the use of the +D but with certain restrictions, such as booting has to be carried out in the 48K mode and direct commands cannot be entered via the +3 editor, (although they will operate from within a BASIC

program). Most of the problems were cured by fitting a replacement ROM chip which was sold with the adaptor.

The adaptor and chip were sold by B.G.Services of Chessington but, unfortunately, Brian Gaff is no longer in business. However, I know that he was able to supply some of his stock items after he ceased trading some 2 years ago so it might be worth giving him a ring on 0181 397 0763 to see if he can help. Failing this, the only source of supply is via the small ads in FORMAT, one of the other Spectrum magazines, or the local papers, or attend one of our computer fairs.

We now have a query from Gothenburg, Sweden, where Lasse Hult is using *The Secretary* on his SAM Coupé. He wonders why he cannot print a document using the F9 key without first going via the PRINT menu, and why the JUSTIFY option will not work on his copy. On the first question, the 'fast print' key F9 will not work without first going via the PRINT menu because that is the way the program is designed. The PRINT menu sets a number of the variables controlling the printing and, as these variables are not given default values on startup, the F9 key will not operate. No doubt it would be possible to alter the program to have these variables set on startup but what do you take as a standard printout to set the default values?

In respect of the JUSTIFY option not working, the usual cause of this is that the INSERT option is being used. JUSTIFY will not work when the SECRETARY is in the insert mode. Personally I never work in the INSERT mode as I find that characters are invariably missed out during word-wrapping, so it is much less bother to work in overwrite mode and toggle INSERT only when I need to insert additional characters or words into the text.

Since we mentioned the subject of SAM bugs a couple of months ago, Andrew Rycraft of Barnet has written to say that he is in the process of writing a very large program (now some 132K long and still growing), and has recently discovered two corrupted lines which he has been unable to amend by editing. He would like to know what can he do to recover from this situation? Looking at the program he sent on disc we can see that this fault is similar to one which has arisen before where a single line number has been been corrupted but, in this instance, two corrupted line numbers have occurred in one section of the program. This is very interesting, as although single line number changes have been seen before, no notice was taken of the exact values they had assumed, but now we have an example of two corrupted line numbers, we can see that their changed values are both 128 less than they should be. This might give a lead to finding the cause of this problem.

You are quite right to say that you cannot correct this type of corruption by editing the line. The only way to recover from this fault is take a listing of the damaged section plus at least one good line either side, then DELETE the block from the first good line before the fault, to the first good line after the fault, and then retype all the deleted lines. This method should also be used where the line numbers are good but the line contents have been corrupted.

I am fairly certain that this problem is not caused directly by MERGE as you suggest but is something to do with paging, as your fault, like all the others I have examined, is located near the start of a 16K page of the program. The fact that there are two corrupted lines close to each other could be explained by the fact that you are still developing the program and the bug reared it's head a second time after you had entered additional program lines somewhere before the line containing the original fault. Why this happens is still a mystery.

Our next letter comes from Peter Allen of Horsell, Surrey and concerns DISCiPLE, which hasn't featured in these pages for some years. Peter says that he recently bought a DISCiPLE and was very happy with it until he cleaned the heads on his 5¼" disc drive, when the cleaning disc became stuck in the drive and he had to dismantle the case to free it. Unfortunately, in the process, he managed to pull out the 34 pin plug and then to replace it the wrong way round. After this the drive refused to work and all that happened was the error message "No disc in Drive 0:1" was displayed. He then obtained a replacement drive which fortunately had the 34 pin socket marked with the polarit,y however, after getting the plug the right way round, when the system was booted the Spectrum displayed a plain white screen, the drive light was on and the motor ran but the system hung-up. Pressing the BREAK button on the +2 freed the computer but on the Spectrum+ the reset button had to be pressed.

Oh dear, this is a sad story! The connection to the DISCiPLE drives is based on the standard used for all computers, with minor variation and with, I believe, an additional line (on pin 1) to provide power to the drive circuit board. Despite these differences, connecting the plug the wrong way round should not damage the drive as all the active pins are even numbered and, apart from the power connection, all the odd numbered pins are not connected or are earthed. As a result, on putting the plug in the wrong way round, no connections are made to the active pins on the drive and the power pin goes to an unconnected socket. What is not so clear is what happens to the DISCiPLE. If an output from the DISCiPLE goes to earth instead of going to a component in the drive circuit board, or two outputs are joined by the earth line, it is possible that a chip providing the output could be damaged.

However, before rushing off to get your DISCiPLE repaired, check that your replacement drive is configured as drive 1. Somewhere on the drive circuit board there should be a jumper block (usually near the connector socket), with four sets of double pins or sockets, marked 0 1 2 3. Connect the jumper across the pair marked 0. If this doesn't fix the problem then you should get the DISCiPLE checked. Finally, in answer to your request on where to obtain another DISCiPLE, the answer is the same as given to an earlier letter; you can only watch the small ads or attend one of the computer fairs and hope to pick one up.

Our last item concerns help requested in earlier issues. In the June issue Tony Wood asked for help in building an address decoder to construct add-on projects for SAM. At last one of our readers has responded. Mike Wynn who lives near Chesterfield built the Kaleidoscope as part of a school project teaching youngsters information technology. Mike still has the instructions for the kit containing a circuit diagram, which although involving a complicated printed circuit board in the building, he thinks it could be built up on a breadboard by an experienced constructor. He also has a set of News Discs containing the series of articles by Adrian Parker on interfacing with SAM. I have sent a copy of Mike's letter to Tony so they can get in touch.

We also have received a letter from Sam Quigg of Limavady, Northern Ireland who read the item on adding a 3.5" drive to the +3 in the November issue. Sam says that the BFORMAT program is now PD and can be obtained from Fountain PD at 11 Camel Road, Silvertown, London E16 2DE, who have a comprehensive list of +3 compatible software. Sam has a +3 fitted with a 3½" 'B' drive and he uses this program plus Dominic Morris's excellent DISCDOS PLUS D emulator.

Thank you Mike and Sam for that. It gives us great pleasure to be able to pass on help from our readers.

That's all we have for this month Please keep sending your problems/ answers to the following addresses:-

Anything SAM or General Purpose.-
Ray Bray (*FORMAT* Help Page),
Spring Cottage, Bourne Close,
Porton, Salisbury, Wilts, SP4 OLL.

Anything +3, CP/M.-
Mike Atkins (*FORMAT* Help Page),
70, Rudgwick Drive,
Bury, Lancashire, BL8 1YE

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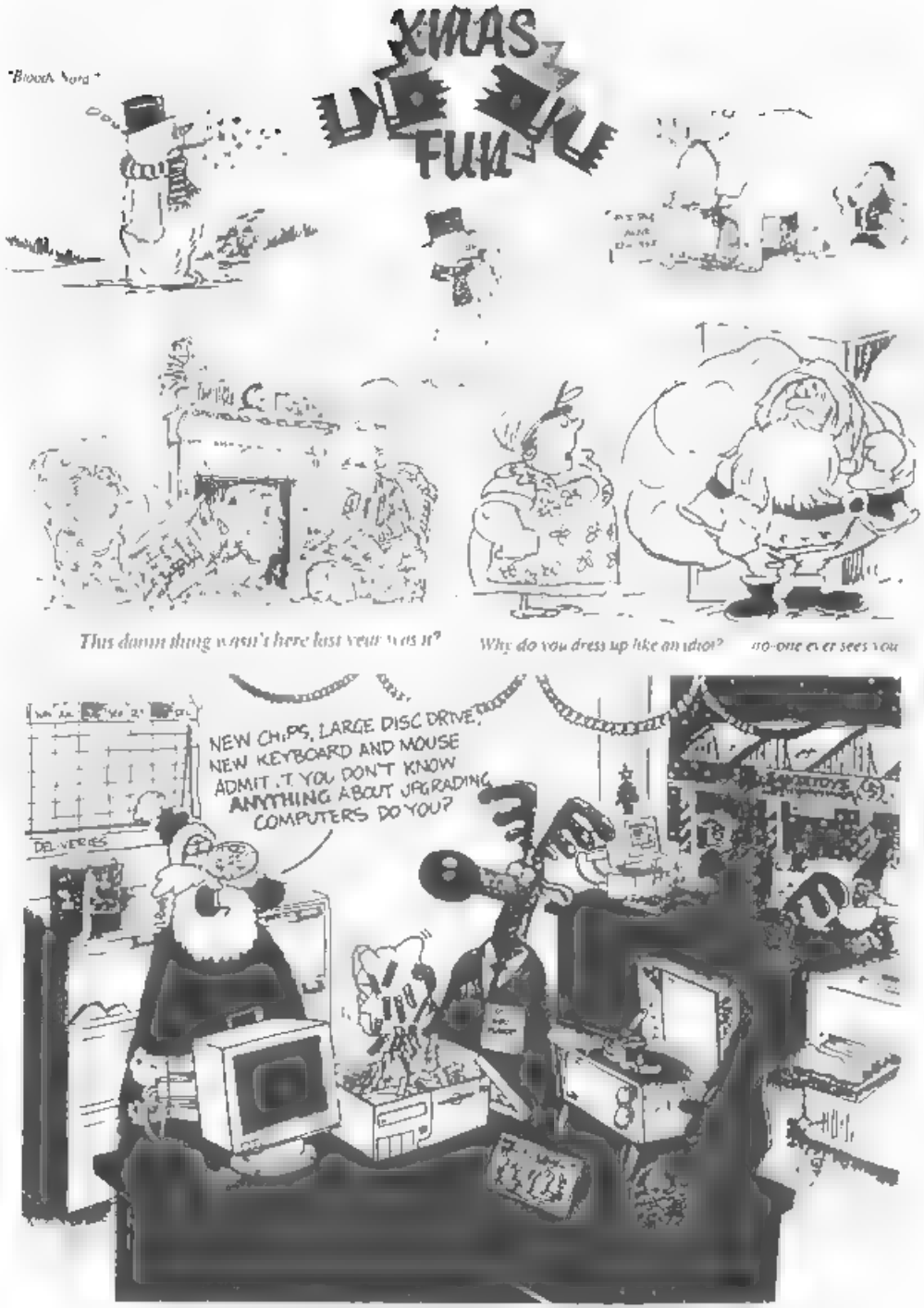

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All Aboard For The *SUPERHIGHWAY*

By:- David Finch.

We were on vacation in the USA recently and we decided that the best way to explore the area would be to hire a car. You've probably seen American highways on TV, with about ten lanes and awesome spaghetti junctions.

To cut a short story shorter, I was navigating and we took a wrong turn. Instead of turning off to New York, we ended up on another highway. This highway was different though, and it soon became apparent that we were on the information superhighway

This was very new to us, so we decided to stay in the slow lane until we got used to the speed. We drove in the slow lane with all the electronic mail. These are your 'Sunday trippers' of the super-highway, not in any rush and quite unimportant (although some of the gossip was quite interesting).

We soon got bored with the slow pace and prepared to pull out into the next lane. Only then did we realize that this highway had hundreds, no thousands of lanes (as far as the eye can see). Traffic filled every lane, going in BOTH directions. This certainly wasn't the place for a nervous driver.

Although the highway seemed infinitely large to us, the fact that our car was only a few nanometres in length meant that the highway was quite compact.

We eventually braved the manoeuvre into the next lane. Suddenly we had to swerve into the next lane again to avoid a sweet little schoolgirl who was stood in the middle of the lane. It would seem that she was collecting information for a school project. The clever thing was that the information rushed to her. The young of today have it so easy!

We found ourselves amongst the flow of home shopping. Interactive product demonstrations zoomed one way while credit card numbers and complaints (in e-mail of course) went the other way. Unfortunately the actual products have to be sent by traditional highways, that is except for software. Oh, and books and magazines don't have physical existence any more, they are all distributed electronically.

During our first few microseconds on the highway we had passed several exit routes. However, we simply couldn't take any of them since we were addicted to the system. It was phenomenal. Once you are on the highway it is impossible to imagine how you managed to live without it.

In the distance we spotted a obscure species. Although the whole highway is a total different world, this really was indescribable. No one in our vehicle could guess what it was. Automatically an on line database found our answer and a few microseconds later a motorcycle courier appeared behind us. I wound down the window and the courier overtook us, passing an electronic envelope on the way. It opened itself and told us that what we saw was highly

encrypted data. The electronic message then offered to give an interactive tutorial. Apparently large corporations spend large amounts of money ensuring that the mass information exchange required for their everyday operation is secure from their competitors.

We saw more scrambled data (although not quite as secure) in the home banking lane. The concept of money is no longer physical, which has been good for the economy since people spend a lot more without realising. Even if you brave the elements and venture out of your chair to the real shops they refuse to accept 'cash'. Money is automatically transferred between electronic accounts

By this time we were becoming quite confident and decided to venture over to the fast lane. Data passed by so fast that all that can be seen is a blur of bytes. We're talking megabytes in microseconds. This was the domain of video data. Video on demand is a revolution to home entertainment. Radio Times is extinct (even in electronic form) since Coronation Street is no longer on at 7:30. It's on when you want to watch it (and Ken Barlow is still in it, he regenerates like Doctor Who).

Feel like a documentary? There are 56849 to chose from. Every episode of Crossroads is available at the touch of a button (I didn't say it was all good).

Interactive movies are a popular pastime. Apparently these originate from 'video games', which gradually evolved into interactive films during the 1990's. People play out characters in virtual worlds, connected to other players via the highway. Everyone's a hero at the end.

Video phone is also made possible by the fast lane's information capacity. More urgent than e-mail, and more personal, it is obviously the preferred method of communication

In the 1990's, the information capabilities were like a horse drawn cart on a dirt track compared to the superhighway. Communication is what the highway is all about, worldwide in high capacity at high speed. I didn't realize that half way through my journey I was transferred over the Atlantic by satellite, passed through Europe by fibre optic cable then transferred to the UK by a microwave link (painful).

You're probably wondering when this will become reality: It's already starting, the technology already exists (perhaps not affordably), and it is probably sooner than you think before it is an everyday part of our lives that we take for granted.

Do you want it?

"Perhaps he) trying to communicate?"

TALKING C

Part 3.

By:- Martin Fitzpatrick.

Welcome again, to another SAM C article. Last time I started to look at the graphic commands available from within the "graphics.h" and "graphics.c" files on the main disc, and it is with these we will continue.

FILLING THINGS IN C

Just as in Basic, there are functions in C for filling areas of the screen with a particular colour and pattern. Firstly there is the simple fill command.-

```
fill (int x, int y, int mode);
```

This fills a section of the screen surrounding position x and y with either a solid colour (when mode is null) or with a predefined pattern (when mode is not null (i.e. mode>0)). Just as in Basic the fill expands from the point you specify until it meets a line of colour blocking its path.

In Basic the command to use a pattern was FILL x,y USING a$. As shown above, to use a pattern you simply set mode to 1. However you need to tell the computer where the data you wish to use in the fill pattern is held so it can be used. This is done using the following function:-

```
setpattern (int *p);
```

In this function p is a pointer (pointers will be discussed later) to the address of a data block 128 bytes long. The block should contain data for 8 bytes (16 pixels) across, and 8 bytes (8 pixels) down. This can be done by using the Basic grab command over an area of 16 by 8 pixels, and then removing the 3 byte header at the start of the $. This can then be poked in memory, and that address passed to this function. The Basic program from this would be as follows -

```
GRAB a$,0,8,16,8
LET a$=a$(3 to LEN a$)
POKE 16384,a$
```

This would grab the data from 0,8 on the screen and then poke it into memory at 16384. Inside the C program you would then use -

```
setpattern (16384);
```

to set the fill pattern to the data held at 16384. Don't worry too much if you haven't a clue what I'm on about, I'll probably go into it in a later article... maybe I'll make sense then.

C SCREEN CONTROL

In much the same way as in Basic there are methods in C to control the opening, closing, and manipulation of screens. In Basic there are five commands: OPEN SCREEN, CLOSE SCREEN, SCREEN, DISPLAY and MODE. There are equivalents for these in C .

Firstly, to open a screen for later use you use the following function...

```
open_scr (int s, int mode);
```

the variable 's' represents the number of the screen you wish to open. This value must be between 1 and 15, and cannot be the same as a screen which has already been opened. The variable 'mode' is the mode in which you want to open the screen and must be between 1 and 4 (see later). In order to close a screen you

have opened you have to use the following function...

```
close_scr (int s);
```

again the variable 's' represents the number of the screen. As before this value must be between 1 and 15, and must be the number of a screen which is currently opened.

To be honest, there wouldn't be much use to opening and closing screens over and over again and so a command is provided for switching between the screen the computer is using. It takes the form -

```
display (int s);
```

Although this function shares its name with the Basic DISPLAY command it is in fact the C version of the SCREEN command. The variable 's' is the number of the screen you wish to make the 'active' screen to which alterations are made. There is no equivalent to the Basic DISPLAY command provided in SAM C, yet there is a way to create the same effect which I will go into some other time because it would take too long to explain just now.

The Basic MODE command also has an equivalent C function, unsurprisingly called -

```
mode (int mode);
```

the variable 'mode' controls the mode the screen should be changed to. As in Basic, changing the mode with this command will also clear the screen, the value must be between 1 and 4. Although you will already know them, here, just for the record, is a brief run-down of the various modes available:-

Mode 4 - The most used mode, default when the computer is switched on. High(ish) resolution, and 15 colours on screen, or 127 with line interrupts.

Mode 3 - High resolution mode, yet it only allows 4 colours (0-3) on screen at any one time. Used in most word processors on the SAM. Good for text

Mode 2 - Bit odd this one, like mode 1 below, except that the cells are only 1 layer deep. Only 2 different colours are allowed in each cell

Mode 1 - Spectrum style mode... screen broken up into cells, each allowing 2 colours (pen/paper).

NOTE: You can open screens in Basic before running your compiled C program and store screens in them ready for manipulation by your program. However it is quite likely that you will have to compile your program, save it and run from Basic - otherwise the SAM C might crash. In order to do this, type in your program, then turn on saving of the code file, and make sure auto-running is disabled. Take for example this slide-show program....

```
#include "stdio    .h"
#include "graphics.h"

main()
{
int scr;

for(scr=2;scr<5;scr++){
display(scr);
pause(0),
}
}

#include "graphics.c"
```

This SAM C program would display images held in screens 2, 3 and 4 in order. The following Basic program would then be used to run the slide-show:-

```
10 SCREEN 1:FOR a=2 TO 15:CLO
   SE SCREEN a: NEXT a
20 FOR a=2 TO 4:OPEN SCREEN a
   ,4:NEXT a
30 SCREEN 2:LOAD "SCREEN1" SC
   REEN$
40 SCREEN 3:LOAD "SCREEN2" SC
   REEN$
50 SCREEN 4:LOAD "SCREEN3" SC
   REEN$
60 LOAD "SLIDSH.BIN" CODE 327
   68
70 SCREEN 1
80 CALL 32768
```

The first line closes all old screens left open, to prevent an error in the second line down. The screens then have the SCREEN$ files loaded into them, and the slide-show code is loaded. The screen is then reset to SCREEN 1 (which is blank) before the code is started.

I hope that helps to make it all a bit clearer! And before this starts to sound like a Basic tutorial, I'll get back to explaining C functions

In Basic, when you want to move areas of the screen around you can use two different commands, depending on how you wish to do it. The two commands are ROLL and SCROLL, and both are supplied in C in the following functions...

```
scroll (int x, int y, int width,
 int height, int d, int n);

roll (int x, int y, int width, i
nt height, int d, int n);
```

As you can see, both commands are very similar to one another, with exactly the same parameters. The variables 'x' and 'y' give the starting x and y co-ordinates of the top left hand corner of the scrolling window to be moved. The next two variables, 'width' and 'height', unsurprisingly give the width and height of the window on the screen (take care to ensure these do not go off the edges of the screen). The maximum values for these depend on the current mode, see the table of values earlier for this. **NOTE:** These two commands only work in modes 3 & 4). The variable 'd' represents the direction the screen will be scrolled in, each direction is assigned a number (1-4)....

1: Left, 2. Up, 3: Right, 4: Down

The only difference between roll and scroll is in the way they handle screen edges. When you scroll an area of the screen, pixels which move off the edge of the window are lost, however with roll they are brought back on at the other side. Because of the time taken to replace pixels back on the screen it is best to only use roll when it is completely necessary.

NOTE: Just thought it would be useful if I pointed something out to you..... In a lot of these functions the parameters are classified as 'int' variables. However, take for example the pen (int i) function - the variable i should never rise above 15 as it is used to represent a pen colour. In cases like this you would declare the variable that holds this colour as a char instead, as this would save memory space (only 1 byte mind you! - but it all adds up)... so for example this snippet...

```
main()
{
int c;
c=5;
pen(c);
}
```

..could be written as...

```
main()
{
char c;
c=5;
pen(5);
}
```

I may sound obvious to some of you but I thought it was a point worth making. So, in other words.... "Always use the smallest possible variable type to hold a value."

Oh dear, running out of time (and room) again, time to dash off to the post office to catch the post. Remember now, if you have any questions, comments, or program ideas then you can contact me through the ***FORMAT*** office and I'll see what I can do.

Don't miss next month's thrilling episode of Talking C, I will have a nice little *Light Cycles* game for you.

Spectrum 128K
RAM-PAGEing

Part 1.

By:- Paul Wallace

Much play has been made about the extra 80K of memory that the 128K Spectrum has in comparison to the Spectrum 48K. However, as any Basic programmer will know, the Spectrum only allows Basic programs to be written in 41K chunks. The RAM disc can be used to extend the amount of memory available to bother Basic and machine code programmers, and this article shows you exactly how you can get the best out of the beast.

A 'RAM Disc' is basically an area in the computer's RAM (Random Access Memory) which is set aside to store programs and/or data. The RAM Disc works much like a disc drive, i.e. you can save files to it, load files from it, erase files which are on it, etc. However, whereas floppy disc drives store files on discs which can only be erased when the user requires so, a RAM disc is erased when then computers is turned off For this reason RAM discs can only be used to store files on a temporary basis. What's the use of a temporary disc drive? Well, a major advantage is its speed - loading a program onto the RAM disc is very quick compared to using a convention disc drive.

USAGE ON THE +3/+2A

The syntax to use the RAM Disc is exactly the same as for using the built-in 3" disc drive in that you can use the normal LOAD, SAVE and MOVE commands etc. The RAM Disc is assigned the drive identifier of M: , with the internal 3" drive being A: and an external drive if fitted being drive B

Because +3DOS claims some of the +3/+2A's extra memory for its own purposes, the RAM Disc on a +3/+2A is smaller in capacity than on the Sinclair 128K and the original (light gray) +2 from Amstrad, being 58K compared to 86K on the earlier machines.

As an example: to store the program currently in memory onto the RAM disc, calling "THISPROG", you would use the following command:-

```
SAVE "M.THISPROG"
```

To load it back, the command is.-

```
LOAD "M:THISPROG"
```

To see the contents of a RAM disc, use -

```
CAT "M:" or CAT "M:" EXP
```

Programs can be copied from floppy disc to RAM disc using the COPY command, e.g' `COPY "A:*.*"TO"M:"`

USAGE ON THE 128K/+2

Commands to use the RAM Disc are as for cassette operations except the filename in quotation marks is prefixed with a !. So for example, to use the SAVE command to store a program called "THATPROG" on the RAM Disc the syntax would be:-

```
SAVE !"THISPROG"
```

The ! prefix is also required for LOAD, MERGE and ERASE commands when using RAM Disc files. A list of the files currently stored on the RAM Disc can be seen by typing: `CAT !`

If you write programs which normally exceed the 41K Basic boundary, then the RAM disc is an easy way of 'increasing' the memory available to program in. For example, if a program requires the use of tables of data which are referred to by the computer at different stages in the program, it is a simple job to store the tables on the RAM disc as DATA files and bring them back into memory (with the 'LOAD !' command) whenever they are needed. This is the principle of the 'Overlay'. An area of memory is set aside specially for receiving blocks of data - data files - brought down from the RAM disc. If the blocks are of unequal size, the area must be bit enough to hold the largest.

Suppose the largest file is 6000 bytes long. Allowing for the fact that memory from 65368 is reserved for user-defined graphics (UDGs), the first byte of the data file should be at 59368. At the beginning of the program you need the statement CLEAR 59367 to set aside that area of memory as the 'overlay area'. To bring down a file from the RAM disc into this area the command:-

```
LOAD "M:file" CODE 59368
```

on a +3/+2A is used, or

```
LOAD !"filename" CODE 59368
```

on a 128K/+2. Even a very large file is transferred in an instant, with very little interruption to the flow of the program. When a different set of data is required it can be brought down to overlay part of, or the whole of the existing data. It is best to be systematic and always load the data to the start of the overlay area. If you are doing a good deal of overlaying, it is worth setting up a variable, say OAREA, with the start address of the overlay area, e.g. LET OAREA = 59368. Then the loading command can be simplified to:-

```
LOAD "M:filename" CODE OAREA
```

or

```
LOAD !"filename" CODE OAREA
```

on a 128K/+2

If you have two sets of data which will both fit into the overlay area at the same time, and particularly if you are reading data continually from one block and storing it in another, you can benefit by having both sets of data in the overlay area but at different positions so that they do not overlay each other. You might of doing that repeatedly, in a loop (see Program 1) but if there is not sufficient room for both sets of data, transfer between RAM and RAM disc is so fast you can `LOAD "M:xxx"` and `SAVE "M:xxx"` or `LOAD !"xxx"` and `SAVE !"xxx"` data files alternatively in a loop without any appreciable loss of

PROGRAM 1

Using overlays in a loop, where two data sets are resident in the overlay area at the same time. Data is transferred from set 2 to set 1.

```
  5 LET oarea=59368
 10 LOAD "M:set1" CODE oarea: L
    OAD "M:set2" CODE (oarea+10
    00): REM Replace LOAD "M:..
    ." with LOAD ! "..." on a 1
    28K/+2.
 20 FOR I=1 to 30
 30 LET value=PEEK (<address in
     set2>)
 40 LET newvalue=value: REM 'va
    lue' subject to calculation
     and stored as 'newvalue'.
    e.g. LET newvalue = value *
    PI
 50 POKE <address in set1>, new
    value
 60 NEXT I
 70 SAVE "M:set1" CODE oarea,10
    00: REM 128K/+2 - SAVE ! "s
    et1" CODE oarea,1000
```

speed - see Program 2 for an example. Note that in Program 2, the loop includes the SAVE command so that data stored in the RAM disc is updated each time round the loop.

PROGRAM 2

Using overlays in a loop with only one data set resident at any one time. Different tables are brought down to the beginning of the overlay area when required by the loop.

```
 5 LET oarea=59386
10 FOR 3= 1 TO 30
20 LOAD "M set2" CODE oarea: L
   ET value=PEEK (<address in
   set2>): REM Replace LOAD "m
   :..." with LOAD ! "....." o
   n a 128K/+2
30 LET value=newvalue : REM 'v
   alue' is subject to an unsp
   ecified calculation and sto
   red as 'new value', e.g. LE
   T newvalue=value*w
40 LOAD "M:set1" CODE oarea: P
   OKE <address in set1>, newv
   alue: REM Replace LOAD "M:.
   ..." with LOAD ! "..." on a
    128K/+2
50 SAVE "M:set1"CODE oarea,500
   0 : REM 128K/+2 - SAVE ! "s
   et1" CODE oarea,5000
60 NEXT w
```

It is surprising how easily a program can grow to such a size that it no longer fits into the main RAM. Yet certain sections of programs are probably used only very occasionally. There may, for example, be a section at the beginning of the program for selecting options, dimensioning arrays and assigning values to variables. That section may never be returned to again, yet it occupies valuable space for the entire running time of the program. A program normally (if it is well structured) consists of a main program which calls a number of subroutines. Many of these subroutines may be quite lengthy and could almost be a mini program and may be quite lengthy. These subroutines may also call other subroutines for such purposes as handling displays, creating sound effects, displaying things on the screen, etc. These 'secondary' subroutines which are used by the primary subroutines are usually relatively short.

It is the primary subroutines which make up the bulk of such a program. Yet at any given time, only one of them is being used. It is the idea of dynamic programming to store each primary subroutine on the RAM disc and bring it down into main RAM only when it is required. The working program thus consists of the main program (which is short) containing a number of short secondary subroutines, and the primary subroutine which is currently in use.

Dynamic programming relies heavily on the MERGE command. All the primary subroutines the main program needs will be stored on the RAM disc. They all must begin with the same line number, e.g. 8000, and their lines must be numbered in even increments, say 10 line steps. Their first line must be greater than any line in the main program and secondary subroutines, but their length is not that important (except the combined length of the main program, the secondary subroutines and the largest of the primary subroutines on the RAM disc must not exceed the 41K Basic boundary).

To bring a primary subroutine into action, the main program has statements of the type:-

```
MERGE "M:newsub": GOSUB 8000
```

On a +3, or for the 128K/+2:-

```
MERGE !"newsub": GOSUB 8000
```


Such statements merge the required subroutine into the main program quite quickly. When a primary subroutine is merged, its lines replace those of the same lines belonging to the subroutine which was merged in previously. If the previous subroutine was longer than the new one, the final lines of the previous subroutine will remain there at the end of the program. They will not be used, of course, since there is a RETURN at the end of the subroutine. Before the subroutine is merged, it is transferred from the RAM disc to the area of memory following the resident program. That area must be big enough to accommodate your longest subroutine.

This means you must plan and take careful note of how much space your main program is taking up as you develop it. To overcome this restriction some long subroutines may have to be held on the RAM disc in sections, each starting at line 8000 and merged and called one at a time. Other subroutines may be unavoidably long, especially when they consist mainly of a long loop. They can also be held on the RAM disc as two or more sections but their line numbers are consecutive blocks - 8000 - 8090, 8100-8190, and so on. The sections are each merged one after the other, building the complete subroutine before it is called. The economy of memory here is that by merging short sections, we do not need to allow so much space for the merging process.

One of the features of merging is that it also merges any variables associated with the merged program. If they have the same names as variables in your main program, those values will be replaced by those of the merged program. This can lead to difficulty, particularly with variables set at the beginning of the program which are supposed to retain their value for the entire run-time of the program. This problem leads to 'mysteriously' changing variables and of course crashes. The solution to this problem is to type CLEAR before you save a subroutine onto disc. That rids the subroutine of all its variables and so eliminates the problem.

128K +2 PROGRAMMING TIPS

Although Spectrum 128K/+2 programmers have a very usable RAM disc, there are no commands available which allow you to erase the whole RAM disc in one go, or to rename a file.

Because the +3/+2A's RAM disc is routed via +3DOS, these features are built-in as standard.

+3/+2A PROGRAMMER'S TIPS

Because +3DOS claims some of the RAM disc for its own use, the Basic programmer is left with only 58K to work with, which upgraders from a 128/+2 to a +3/+2A will find very annoying. However, it is possible to limit the amount of space that +3DOS 'steals' in order to increase the size of the RAM disc to 62K (its absolute maximum). The method to do so is not easy, because it requires machine code. However, there is a public domain utility called MAXIRAM which does the job of boosting the RAM disc from 58K to 62K for you and you could be able to get hold of a copy from one of the Spectrum PD companies.

For those machine code programmes wishing to know how this can be done, the idea is based around the DOS SET 1346 routine in +3DOS at address 319 (013F hex). Page 237/238 of the +3 manual details what it does, but in our case we need to use the routine to only give +3DOS the smallest space possible for its cache and buffers. This can be

done by setting the D, E, H and L registers to 0, 0, 0 and 128 prior to calling the DOS SET 1346 routine (remembering of course to switch the +3DOS ROM into memory at address 0. Although once this routine is called, it erased the contents of the RAM disc, you are left with a 62K RAM disc to use. Page 238 of the +3 manual says that 'a cache size of 0 will still work but will seriously impair the floppy disc performance' - this is not strictly true as all normal loading, saving, copying, etc can be done without noticing any difference whatsoever. However, if you are copying particularly large files (over about 50K) from disc to disc you may experience problems with the COPY command not being able to cope properly. This is because the buffer is not as big as it is normally and so results in some abortive COPYs.

Next month, all being well, I will finish this look at the 128K Spectrum's paging system.

"Oh come all ye faithful,
Read your Christmas FORMAT"

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YOUR LETTERS

Dear Editor,

My SAM's lost it's voice. It still beeps, but doesn't play music any more. I've looked for a replacement sound chip here in NZ, but can't find one. Any suggestions where I might get one? Or could something else be broken?

I expect you've realised that the joystick splitter you published was backwards - I noticed it on the second reading. It's a clever idea though! I tried to do the same thing with diodes, I bought a big bag of mixed diodes, but none of them seemed to work quite right. Is there any chance that these joystick splitters could be sold ready made?

There have been at least two suggestions of how to fix the COMMS interface (which it seems isn't being sold any more), is there a company that would do this? Also, does someone sell network cables? Could ***FORMAT*** publish a diagram of how they are wired? Any ideas about how the NMI button could be fixed? (There was a mention of this a while back).

In regard to issues lost in the post, I seem to be missing Vol 9 No 2, and no 12, but I'm not sure if they never arrived, or I just misplaced them. Oh Well. Could you reduce my subscription by two months, and send me these issues again?

Enclosed should be a program to load IBM SNA snapshots (from SAM disc).

Yours sincerely, James Gasson.

I doubt if you will find the Philips SAA 1099 sound chip anywhere now as Philips have discontinued it (unless you order in thousands). Still, we can supply, £10.95 + the usual p&p. It is not too hard a job to change if you can handle a soldering iron and we supply a chip socket so you don't risk cooking the chip as you fit it.

And no, I did not realise that the joystick circuit was back to front. Must admit I would not have known anyway. As to using diodes, yep they will work, but you need germanium to avoid the voltage drop I'm told. If there was demand for a splitter then of course we will look at producing it.

The COMMS interface is still made to special order, although when the existing stock of boards is used up I doubt that any more will be produced. As to fixing it, I've never been convinced it was broke.

NMI button debounce? Anyone care to draw up something? ***Ed.***

I'll send you the missing issues but not deduct subs as you were kind enough to send in a small article. ***Jenny.***

Dear Editor,

Just a short note to say thank you for all the work you must put into organizing the Gloucester Shows. This was my first visit to a SAM/Spectrum show and I really enjoyed it.

I would also like to thank Martyn Groen for converting 'Pekin' to run on my SAM.

After reading P.Ahamed Basheer's letter in Novembers ***FORMAT***. I too enjoy playing games on my SAM. I would like to read other member's comments on

games. I have been playing a ladder and platform game for a number of weeks. I would like to recommend it to any games players. The game is 'Impostors' from Stephen McGreal at Mungus Software. I would give the game a rating of 95 out of 100.

May I wish you all the best for Christmas and the New Year.

Yours sincerely, John Turner.

Nice to hear from you John, glad you enjoyed your first visit to a Gloucester show and we look forward to seeing you at the next one. ***Ed.***

Dear Editor,

Please edit the following and print if you think it maybe of value.

As part of my job, I've had a one day seminar on EMC and EMC regulations and thought it would be worthwhile passing on some of the relevant details. We were given this from the viewpoint of a customer.

The toughest parts of the regulation were brought in to 'protect' domestic appliances ie TV etc.

It was as a warning about what the CE mark means, now the manufacturer can attach a CE mark provided he believes that his equipment meets the 'standard' and can produce a 'declaration of conformity'; he does not have to actually test, in fact 'Certification Testing' is not mandatory provided he has sufficient confidence in his equipment. How he gets confidence is up to him, and he would only be at risk if someone bought CE marked equipment and then complained in court if they could show it did not meet the standard. This has not been tested under English law as far I know.

Please withhold my name and address for this letter.

Yours sincerely, TW.

Well, as you can see, we do consider your letter of value, in fact we consider all letters are of value - we just don't always have room to print as many as come in.

The CE mark is causing a lot of confusion in the industry. Most seem to take the stance that your letter does. However, there are others that claim that if it is not tested - in the exact form that it is sold - it ain't legal. As the Trading Standards Officers have no money they will not take action unless they get a specific complaint. And even then, as there is no case-law precedent as yet, few TSOs will be willing to press to the full extent of the law when they do find an infringement.

On the radio the other day there was a comment that: "in Britain it is legal until proved otherwise, in Germany it is illegal until proved otherwise, in Italy they just don't care and get on with it." ***Ed.***

Dear Editor,

This stamp is going to have to work hard as there is a lot to fit in, but I shall try to be as brief as possible. Firstly, I enclose my application for membership renewal, together with a cheque. I am sorry to say that the 'Which three articles did you LEAST enjoy' question has, once again, to remain unanswered.

You will find that I have enclosed a second cheque, for £20, as I wish to order a SAM_CLOCK to reward myself for being a good boy over Christmas! Remaining on the hardware theme, I seem to remember reading in ***FORMAT*** that an internal printer interface for the Coupé was a practical proposition, if so, are there any plans for such a device, even as a kit. Another useful upgrade would be an internal memory card to give an extra 4 Meg to provide, say, an 800K ramdisc, space for sixteen MODE 3

or 4 virtual screens, room for a spell check dictionary as well as a large text file like the ***FORMAT*** index I am writing, using *The Secretary*, which is already about twenty pages long. (I use *The Secretary's* FIND option to search for a related word and hey presto, after finding twenty wrong occurrences of the right word up pops the right one, if the spelling is correct that is. It may not be sophisticated but it works).

On a number of occasions you have mentioned the possibility of publishing a SAM Basic guide, but so far zilch. Take heart and put down your busy pen, I recently discovered 'The Complete Guide To SAM Basic' sold on disc for £4 by SAM PD at 18, Mill Lane, Glenburn Road, Old Skelmersdale, Lancs, WN8 8RH. Very good, worth four gold stars.

Until a few years ago, the hobby electronics magazine, 'Everyday Electronics' published a hardware series on the Spectrum called 'On Spec', which lasted about four or five years. If it were possible to get them to accept a review on ***FORMAT*** and SAM then some old Spectrum hands might be persuaded into the fold to not only boost our membership, but do it with people of an electronic bent.

Finally, in August's Help Page, just after my report on SAM's ability to drive a multi-sync monitor, Paul Dudley of Tolworth, Surrey, asked for help in getting a Dell VGA PC monitor to work on his SAM. I was wondering if he had solved his problem or if anyone else had managed to get a standard VGA monitor to work on SAM, as this would permanently solve the supply problem of cheap monitors.

PS I was just about to print this out when plop through the letter box came the first Christmas card of the year, and it's only 22nd November, but it has come from South Africa, I suppose they were concerned about the effect of the cold weather on the elastic. So not to be out done let me wish both of you and all our readers A Merry Christmas and a Happy New Year!

Yours sincerely, Kenneth Murray-Taylor.

We are currently looking into the internal printer interface, your's was only the second prod since it was mentioned but I will bring you some more news in the New Year.

Thanks for the renewal and the Christmas wishes. ***Ed.***

Dear Editor,

Would you consider reprinting the first two volumes of ***FORMAT*** as a limited run if there was a big enough demand. Perhaps as a response to an advertisement advising all interested people to return a coupon or a slip to allow you to see if it is viable.

Also does any one know if it is possible to make Tasword+2 for the 2A (The +2 & +2A are supplied on the same tape) version work on a +3 and utilize the disc drive. Is the code completely different or is the routine calling the drive shut off or redirected to the tape load/save routines. I have a working PLUS D version of Tasword but would like to get the +3 working for my girlfriend's daughter who could use a word processor and has a +3 which is going to waste as she has never got interested in it.

Yours sincerely, Kevin Cross.

Some of the original artwork is not beyond reusing but I have said once before that if there was demand we may do a 'Best Of' from the early volumes. ***Ed.***

Dear Editor,

Paul Farrow's very interesting 'Space Saving' article in the November

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Revelation Software, c/o 45, Buddle Lane, Exeter, EX4 1JS.
(For a list of our other current software see last months advert)

FORMAT needs a correction on Page 23.

INT PI generates 3, not ABS PI which generates 3.14...

The idea of memory saving tended to get denigrated as larger memories became available, however, an added attraction is that storage space is also efficiently used.

Yours sincerely, Roy Burford.

Thanks Roy. ***Ed.***

Dear Editor,

Just received November 1996 issue of ***FORMAT***. For some time I have been wondering whether to renew my membership when it runs out next April.

The main reason for these thoughts is the number of articles which, a) I cannot understand, b) are about software which I do not own, c) are about hardware which I do not own or use, and d) Have no interest to me.

Rather than moan and whinge, I thought I would submit something I wrote some time ago to help with my passion, namely Contrast Bridge. I might interest others and I am sure can be improved.

Hope you can use it.

P.S. I am 71 which probably explains my lack of understanding.

Yours sincerely A.G.Goldhawk.

We have sent your contribution on to John Wase for the **Short Spot**, many thanks for sending it in. Don't let your age put you off, if you are ever unsure of something always feel free to give us a ring or write in like this, our aim is to help everyone (regardless of age) to get the most from their machines. To do this we are always open to questions, if you don't understand something then we are here to explain it. Not everyone will understand the same explanation, so if something in ***FORMAT*** does not make sense to you then let us know and we will try to explain it another way. ***Ed.***

Dear Editor,

I have a Spectrum 128K on which I do my accounts and various scientific bits and pieces. I am looking for a source of Microdrive Cartridges. I wonder if you could help me?

I believe you publish ***FORMAT***. Could you please tell me something about that magazine. Could I have a copy of the Spectrum and SAM Resource Directory?

Yours sincerely, Jas.T.Lornie.

Anyone know of a source of Microdrive Cartridges? If so drop us a line and we will get the details into a future issue. New members get a copy of the directory and all the info on ***FORMAT*** should be with you by now. ***Ed.***

Dear Editor,

As I have just become the owner of an Epson Stylus colour 500 and I enclose an order for the Colour Dump program SCD-05.

I would also like to obtain a copy of the complete 'New Tricks for the Secretary' by Tony Kinch. I would be willing to pay if this was possible. I have wasted many hours trying to do it myself but even though he has made it as simple as he can, I am still unable to get it to work. I would be pleased if you can help me in this.

Many thanks for all the hard work you do to make ***FORMAT*** such a good magazine.

Yours sincerely, E.Swinhoe.

Hope the Colour Dump works with your new printer, let us know how you get on - in fact how about a short write-up on it.

Don't know where you are going wrong with the amendments to The Secretary, I've heard from a few people who seem to be doing very well with it. We will look

into the possibility of doing a disc of the code but in the meantime I would just take things step by step and it should work. *Ed.*

Dear Editor,

Many thanks for your offer in the October ***FORMAT*** to ask Carol Brooksbank to put her listing for the 'Autograph' program on a disc for me.

I did in fact decide to have a go myself and somewhat to my surprise I got it right first time. I even produced a small addiction which printed the names of the chosen entries at the top right of the graph.

Many thanks for the offer and for not printing my address which would have caused me embarrassment if I had received a number of replies.

Yours sincerely, Vic Taylor.

Good for you Vic, determination paid off in the end. It just goes to show that the best way to learn is by trying. *Ed.*

Dear Editor,

In the September issue of ***FORMAT***, Mr Round was asking about PLUS D's and where to get hold of one. Well, I had two of them but neither would work. So I carefully took the chips out and blew on them, then very carefully (because the legs are fragile) put them back in again.

Now they work perfectly alright. Perhaps Mr Round can try this with his broken PLUS D.

Also, I would like to know if I can put two 'Two ups' together as I want to join up more than two interfaces. And, could you please tell me what the little light and plug is on the side of the two up.

Yours sincerely, George Munroe.

Don't know but it sounds like a bit of tarnish on the contacts to me and as luck would have it moving them has cured it.

As to the Two-ups, there is no reason why two (or more) can't be linked. The light is just to show power is on and the socket is so you can plug in extra power - not that many will ever need it. *Ed.*

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

This is YOUR letters page so it is up to you to fill it with interesting things. Come on, get writing, any subject even remotely related to computers. Just keep things as short as you can so we can fit in as many as possible each month. Please write clearly or type your letters. Send them to the address on page 3 or email them to us at: FormatPub@aol.com

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And finally, to round of the final issue of ***FORMAT*** for 1996, a little contribution from Sam Quigg.

The Cure

Oh doctor, dear doctor, what can I do?
I've got an affliction, it isn't just 'flu,
My fingers keep tapping, my brain's in a fug,
I think I've been bitten by the Spectrum bug.
I get up each morning one thought on my mind,
Tir-nan-Og and Dun Darrach I'll just leave behind,
A walk in the country will suit me much better,
But by lunchtime it's TASWORD to type up a letter!
My club newsletter is next in the queue,
So it's load up The Writer and use Artist II,
A flick through the listings for some cute clipart,
To enliven the margins and make it look smart.
The telephone rings, it's my friend down the road,
His PLUS D won't format, his snapshots won't load,
Try swabbing the contacts and cleaning the head
Of your disc drive, or load some tapes instead!
Hark! what do I hear? it's a noise at the door,
An envelope lying there on the floor,
Quick tear it open, it's the cure that I need,
The latest from ***FORMAT***, just sit down and read.

Sam Quigg, 1996.

SOFTWARE

SAM Coupé Software On 3½" Disc

PCG's DTP PACK. The famous package including WordMaster, TypeLiner, HeadLiner. Complete on disc for SAM. R.R.P. £37.50. *SPECIAL READER'S BONUS* - Now includes 2 extra font packs worth £15.90 bringing the total pack value to £53.40.

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Volumes 1, 2 and 3 are now out of print. Volumes 4,5,6,7 and volume 8 are available as complete volumes. Order by giving the Volume N° (i.e. V5).

Price: £14.00 per volume.

All issues, from Volume 8 N° 1 (September 1994) to the latest issue, are available separately. To order just quote the Volume and Issue N°.

Price: £1.75 each, (5 or more £1.50 per copy).

HARDWARE

DUC LEAD For use with DISCIPLE or PLUS D. This 'Dualing Up Cable' allows two disc drives to be attached without the need for opening one drive to alter its ID. Allows you to switch drives to even out wear without opening cases. RRP £16.95

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+3 PRINTER LEAD. For +3 or +2a. RRP £12.95

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SAM COUPÉ TECHNICAL MANUAL Version 3.

The real inside info on SAM. No SAM is complete without one. RRP £16.95

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Music Maestro

Supplied on 3½" disc for PLUS D/DISCIPLE (3" for +3) this excellent program allows you to write music either just for the fun of it or to include in your own games software where it plays under interupts. Full manual, lots of demo tunes. The ideal way to write music on the Spectrum. R.R.P. £9.95

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